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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/825,452	04/02/2001	Michael Mermelstein	12325-002001	1325

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EXAMINER

CHOI, WILLIAM C

ART UNIT	PAPER NUMBER
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2873

DATE MAILED: 11/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/825,452

Applicant(s)

MERMELSTEIN ET AL.

Examiner

William C. Choi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7,8,12,13,18-20 and 23-30 is/are allowed.
- 6) ☒ Claim(s) 1-6,9-11,14-17,21,22,32 and 34 is/are rejected.
- 7) ☒ Claim(s) 31 and 33 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 April 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☒ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Drawings*

This application has been filed with informal drawings, which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

The drawings are objected to because the "Brief Description of the Drawings" references a "Fig. 8a" but no Fig 8a is provided.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 9-11, 14-17, 21-22 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Inagaki et al.

Regarding claim 1, Inagaki et al discloses a method for spatially modulating radiation (Abstract, Figure 3) comprising: directing at least one radiation beam (column 5, lines 51-53 and column 7, lines 31-41, Figure 3, "L") upon at least one surface acoustic wave diffractive element (column 7, lines 33-36, Figure 3, "38"); and driving at least one of said surface acoustic diffractive elements with a plurality of modulating signals (column 7, line 55 – column 8, line 14, Figure 3, "37") to generate a plurality of

independently modulated output radiation beams having parameters (column 7, line 55 – column 8, line 14, Figure 3, “L1”, “L2” and “L3”).

Regarding claim 2, Inagaki et al further discloses the modulating signals being electrical (column 7, lines 55-56, Figure 3, “37”).

Regarding claim 3, Inagaki et al discloses the driving comprising modulating at least one output radiation beam parameter selected from the group consisting of the direction (column 7, lines 36-41, Figure 3), the amplitude, phase, and frequency of the modulated output radiation beams.

Regarding claim 4, Inagaki et al discloses the driving comprising the application of a plurality of separate modulating signals for each surface acoustic wave diffractive element (column 7, lines 55-57).

Regarding claim 5, Inagaki et al discloses at least one of the modulating signals being characterized by a plurality of frequencies (column 7, lines 55-57).

Regarding claim 6, Inagaki et al discloses a laser directing the radiation beam (column 5, lines 51-53 and column 7, lines 31-41).

Regarding claim 9, Inagaki et al discloses the modulated output radiation beams directed upon photosensitive material (column 9, lines 39-54, Figure 5, “8”).

Regarding claim 10, Inagaki et al discloses an apparatus for spatially modulating radiation (Abstract, Figure 3) comprising: at least one surface acoustic wave diffractive element (Figure 3, “3”), each element inherently having a surface, at least one transducer of surface acoustic waves (column 7, line 57, Figure 3, “33”), a source of a plurality of modulating signals driving the at least one transducer to transduce a surface

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acoustic wave in the surface of at least one of said surface acoustic wave diffractive elements (column 7, lines 24-30 and line 55 – column 8, line 14, Figure 3, “37”), a source of at least one input radiation beam constructed and arranged so that at least a portion of the input radiation beam strikes a surface acoustic wave diffractive element from outside the surface of that surface acoustic wave diffractive element (column 7, lines 31-41, Figure 3, “L”), and a plurality of modulated output radiation beams modulated by respective ones of said modulating signals (column 7, lines 43-59, Figure 3, “L1”, “L2” and “L3”).

Regarding claim 11, Inagaki et al discloses the source of radiation being a laser (column 7, lines 31-33), which would inherently have a cavity.

Regarding claim 14, Inagaki et al discloses at least one surface acoustic wave diffractive element having an active area (column 7, lines 24-30, Figure 1, “32”).

Regarding claim 15, Inagaki et al discloses the active area being piezoelectric (column 6, line 66 – column 7, line 8, Figure 1, “32”).

Regarding claim 16, said active area of Inagaki et al would inherently have a reflectivity greater than zero, this being reasonably based upon Inagaki et al disclosing the input laser beam being deflected (column 7, lines 31-41).

Regarding claim 17, said active area of Inagaki et al would inherently have a transmissivity greater than zero, this being reasonably based upon the indicated piezoelectric materials (column 7, line 7) having well-known transmissive characteristics as well as Inagaki et al disclosing the transmitted beam “Lo” (Figure 3).

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Regarding claims 21 and 22, Inagaki et al discloses the transducer comprising interdigital electrodes (column 7, lines 9-13, Figure 3, "33") deposited on top of a piezoelectric substrate (column 6, line 66 – column 7, line 8, Figure 1, "32") and being regularly spaced (Figure 3, "33").

Regarding claim 32, Inagaki et al discloses wherein said active area comprises at least one thin membrane (column 7, lines 24-30, Figure 1, "32").

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inagaki et al.

Regarding claim 34, Inagaki et al discloses as set forth in claim 14, but does not specifically disclose the surface acoustic being flexural waves. However, it is considered to be obvious well within the abilities of a person of ordinary skill in the art for the surface acoustic waves of Inagaki et al to be flexural waves since it is well known in the art for surface acoustic waves to exhibit flexural effects in the medium through which it traverses.

***Allowable Subject Matter***

Claims 7-8, 12-13, 18-20 and 23-30 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to teach a combination of all the claimed features as presented in claims 7-8: a method for spatially modulating radiation as claimed specifically wherein the radiation beam directing is with a pulsed radiation beam.

The prior art fails to teach a combination of all the claimed features as presented in claims 12-13: an apparatus for spatially modulating radiation as claimed specifically wherein the surface acoustic wave diffractive elements are positioned inside a laser cavity so as to direct output radiation beams out of the laser cavity.

The prior art fails to teach a combination of all the claimed features as presented in claim 18: an apparatus for spatially modulating radiation as claimed specifically wherein at least one surface acoustic wave diffractive element has a patterned active area.

The prior art fails to teach a combination of all the claimed features as presented in claim 19: an apparatus for spatially modulating radiation as claimed specifically wherein at least one surface acoustic wave diffractive element has an active area on a curved surface.

The prior art fails to teach a combination of all the claimed features as presented in claim 20: an apparatus for spatially modulating radiation as claimed specifically wherein the active area comprises multiple regions with different materials.

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The prior art fails to teach a combination of all the claimed features as presented in claim 23: an apparatus for spatially modulating radiation as claimed specifically wherein the transducer comprises interdigital electrodes deposited and irregularly spaced on top of a piezoelectric substrate.

The prior art fails to teach a combination of all the claimed features as presented in claims 24 and 25: an apparatus for spatially modulating radiation as claimed specifically wherein the at least one surface acoustic wave diffractive element includes at least one transducer to create surface acoustic waves in a plurality of active areas

The prior art fails to teach a combination of all the claimed features as presented in claim 26: an apparatus for spatially modulating radiation as claimed specifically wherein the transducer is electrically connected to a second transducer.

The prior art fails to teach a combination of all the claimed features as presented in claim 27: an apparatus for spatially modulating radiation as claimed specifically further comprising at least one second transducer constructed and arranged to transduce acoustic to electrical energy.

The prior art fails to teach a combination of all the claimed features as presented in claims 28 and 29: an apparatus for spatially modulating radiation as claimed specifically further comprising a second surface acoustic wave diffractive element located on the same substrate as the at least one surface acoustic wave diffractive element.



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The prior art fails to teach a combination of all the claimed features as presented in claim 30: an apparatus for spatially modulating radiation as claimed specifically wherein the source of modulating signals provides radio frequency electrical signals.

Claims 31 and 33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to teach a combination of all the claimed features as presented in claim 31: an apparatus for spatially modulating radiation as claimed specifically wherein the surface acoustic wave diffractive element has first and second active areas characterized by different mechanical responses.

The prior art fails to teach a combination of all the claimed features as presented in claim 33: an apparatus for spatially modulating radiation as claimed specifically wherein the active area is constructed and arranged to magnify the amplitude of the surface acoustic wave.

### ***Response to Arguments***

Applicant's arguments filed September 23, 2002 have been fully considered but they are not persuasive. Applicant argues that the claimed process is different from that described in the reference since it calls for "having the at least one beam directed **upon** the surface acoustic wave diffractive element as distinguished from **into** the diffractive element as disclosed in the reference". Examiner maintains that the reference (Inagaki

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et al) still meets the limitations as stated in the claims since it discloses radiation beam "L" directed upon the surface acoustic wave diffractive element "3" in Figure 2.

Applicant does not claim any specifics regarding what comprises the surface acoustic wave diffractive element, so therefore this limitation would be met by the disclosed reference. The same argument applies for the rejection of claim 16 (and corresponding dependent claims). Without any additional limitations in the claim regarding the surface acoustic wave diffractive element, this reference is still applicable for use in the rejection. Furthermore, the radiation beam "L" would inherently be directed "upon" any surface of the diffractive element in order for it to traverse "into" the element.

### ***Prior Art Citations***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lean et al (U.S. 3,736,044) is provided as an additional reference should applicant choose to amend the claims.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William C. Choi whose telephone number is (703) 305-3100. The examiner can normally be reached on Monday-Friday from about 9:00 am to 6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached on (703) 308-4883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

W.C.  
William Choi  
Patent Examiner  
Art Unit 2873  
November 25, 2002

  
Georgia Epps  
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